FOREST PEST CONDITIONS REPORT

FOR

1977

ILLINOIS, IOWA, MICHIGAN, MINNESOTA, MISSOURI, AND WISCONSIN

NORTHEASTERN AREA, STATE & PRIVATE FORESTRY
ST. PAUL FIELD OFFICE

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CONIFER DEFOLIATORS

Pest: SPRUCE BUDWORM (Choristoneura fumiferana (Clemens))

Location: Michigan, Minnesota, Wisconsin

Host: White spruce, Balsam fir

Extent of damage: Populations of spruce budworm have decreased to non-damaging levels except in northern Wisconsin and the adjoining portion of northwestern Michigan. Minnesota reported only 150,000 acres defoliated this year, a drop from 1.2 million acres affected last year. Populations in lower Michigan continued to decline while those of the upper peninsula remained at high levels. The western counties of the upper peninsula (Gogebic, Ontonagon, and Houghton) showed a drop in reported defoliation while the more eastern counties (Iron, Mackinac, Marquette, and Luce) showed an increase. Chippewa, Delta, Alger, and Schoolcraft counties remain the same or slightly higher. Defoliation was severe on approximately 140,000 acres in Oneida, Forest, and Vilas counties in Wisconsin. Moderate to heavy defoliation was also reported on small, scattered stands in Bayfield, Iron, and Sawyer counties where egg counts were much lower than they have been the last few years.

Remarks: Decline of populations is due to adverse weather conditions and, in Minnesota, death of a large portion of the host trees. Aerial surveys and ground checks were used to delineate nearly 750,000 acres of dead balsam fir on the Superior National Forest in Minnesota. No chemical or biological suppressants were used. Egg mass surveys indicate a very low population of spruce budworm throughout the Lake States in 1978.

Pest: JACK PINE BUDWORM (Choristoneura pinus Freeman)

Location: Central Minnesota and Western Wisconsin

Host: Jack pine

Extent of Damage: The 5,000 acre area of heavy defoliation detected in 1976 in the Beltrami Island State Forest near Warroad, Minnesota, collapsed during 1977. Surveys failed to detect any measurable defoliation or damaging larval populations during ground and aerial surveys.

Another area of approximately 9,000 acres west of Bemidji, Minnesota was lightly to moderately defoliated. Surveys of remaining foliage, condition of buds, extent of staminate flowers, and egg mass number indicate that chemical control is not necessary in 1978. The few moderately defoliated areas have been scheduled for logging during the winter of 1977-78.

In Wisconsin jack pine budworm populations are lower than any time in the past 25 years; one exception is Douglas county where chemical suppression is being considered on some industrial forest land.

Pest: PINE TUSSOCK MOTH (Dasychira plagiata (Walker))

Location: Minnesota

Host: Jack pine, Red pine, Eastern white pine, Spruce, and Fir

Extent of Damage: Continuing surveys for this pest showed populations to be very low.

Remarks: Extensive outbreaks of this insect have occurred in the past and losses, especially of jack pine, have been serious.

Pest: ARBORVITAE LEAF MINERS (Argyresthia thuiella (Packard)

Location: Oscoda County, Lower Peninsula, Michigan

Host: White cedar

Extent of Damage: Most populations have subsided except in Oscoda county, Michigan, which continued to have noticeable defoliation.

Remarks: Most white cedar stands have already began to recover. One hundred and fifty thousand acres were affected by this insect in 1976.

Pest: HEMLOCK LOOPER (Lambdina fiscellaria (Guenee))

Location: Alger and Schoolcraft counties, Upper Peninsula, Michigan

Host: Hemlock

Extent of Damage: Host trees suffered light to moderate defoliation.

Pest: BAGWORM (Thyridopteryx ephemeraeformis, Haworth))

Location: Missouri

Host: Pfitzer evergreens and Eastern red cedar

Extent of Damage: Defoliation was moderate to heavy on pfitzer evergreens over the State and light on naturally occurring eastern red cedar.

Remarks: Defoliation of ornamentals by this insect has been a continuing problem in Missouri.

Pest: Introduced PINE SAWFLY (Diprion similis (Hartiz))

Location: Brainerd, Minnesota

Host: White and Scotch Pine

Extent of Damage: Surveys show localized heavy defoliation by second-generation larvae defoliation.

Remarks: High numbers of healthy overwintering cocoons indicate a probable increase in the first-generation population in 1978.

Pest: LARCH SAWFLY (Pristiphora erichsonii (Hartig))

Location: Iron, Dickinson, Luce, and Chippewa counties, Upper Peninsula, Michigan, and northern Wisconsin

Host: Tamarack

Extent of Damage: Host trees suffered moderate to heavy defoliation.

Pest: YELLOWHEADED SPRUCE SAWFLY (Pikonema alaskensis (Rohwer))

Location: Common in spruce stands in Minnesota

Remarks: A 350 acre stand on the Chippewa National Forest may be treated in 1978 if presuppression surveys show damaging population levels.

Pest: LOBLOLLY PINE SAWFLY (Neodiprion taedae taedae (Ross)) /= americanum (Leach)/

Location: Missouri, Southeast Wisconsin

Host: Loblolly pine and short leaf pine

Extent of Damage: Defoliation decreased from 1976 levels and was very light in most areas of Missouri in 1977. In Wisconsin many plantations had scattered defoliation while timber types had up to 80% defoliation.

Pest: EUROPEAN PINE SAWFLY (Neodiprion sertifer, (Geoffroy))

Location: Missouri, Southeastern Wisconsin

Host: Scotch, Red, and Jack pines

Extent of Damage: Defoliation was very light in 1977 in Missouri. Populations are high in some red and scotch pine plantations in southeastern Wisconsin, particularly in Walworth county. A parasite of the sawfly, Lophyroplectus luteator, was released in a heavily infested red pine plantation near LaGrange in Walworth county.

Pest: REDHEADED PINE SAWFLY (Neodiprion lecontei (Fitch))

Location: Missouri

Host: Jack, Red, Shortleaf, Loblolly pines

Extent of Damage: Very light in 1977.

HARDWOOD DEFOLIATORS

Pest: FOREST TENT CATERPILLAR (Malacosoma disstria Hubner)

Location: Northern Michigan, Minnesota

Host: Aspen and other hardwoods

Extent of Damage: Forest tent caterpillar populations have increased substantially since 1976 in northern Michigan and Minnesota. Poplar and ash were heavily defoliated; oak and sugar maple were also defoliated in stands where they were mixed with poplars. In 1977, defoliation jumped from 133,000 acres in the upper peninsula of Michigan to over 740,000 acres. In northern Minnesota 2.4 gross million acres of moderate to heavy defoliation were reported with an additional 8 million gross acres of light scattered defoliation. Larvae and pupae of the insect in Minnesota show an incidence of only about 15% parisitism and disease so the population is expected to continue to build in 1978.

Remarks: Past outbreaks of this insect in Michigan have lasted from two to four years, so this population should begin to decline within the next couple of years. Numerous reports of large numbers of the parasite, Sarcophaga aldrichi Parker, would tend to support this hope. No suppression measures have been used in 1977.

Pest: EASTERN TENT CATERPILLAR (Malacosoma americanum (F.))

Location: Lower Peninsula, Michigan; Wisconsin; Missouri

Host: Black cherry

Extent of Damage: Michigan reported a population increase to tremendously high levels in 1977 throughout the lower peninsula, and especially in Newaygo county. Light to moderate populations were reported scattered across Missouri. Wisconsin reported unusually high populations over most of the State.

Remarks: In Michigan, large numbers of larvae starved to death after completely defoliating all of the cherry in the vicinity. Larvae were seen feeding on sweet fern, blueberry, and even grass. This insect was responsible for causing the greatest public outcry over a forest insect in recent years. Numerous calls and letters were received expressing concern over the severe defoliation of black cherry and other host trees. Most people were satisfied, however, after they were informed that the tent caterpillar has little impact on the forest.

Pest: GYPSY MOTH, (Lymantria dispar (L.))

Location: Michigan and Wisconsin

Host: Oaks, other hardwoods and conifers

Extent of Damage: Gypsy moths were reported in both Michigan and Wisconsin in 1977. A total of 12,030 acres were treated with Dimilin (R) in Berrien, Isabella, Mecosta, Saginaw, and Washtenaw counties, Michigan. No male moths were trapped after treatment. Outside the spray area, populations have increased over a four county area. Plans are being made to spray Dimilin on 140,000 acres in 1978. Two applications of the insecticide will be made at the rate of 0.03 lb/acre.

Male moths were captured again in 1977 in disparlure baited traps in Wisconsin. Moths were caught for the third consecutive year along the Fox river in Appleton in Calumet county; 5 in 1975, 10 in 1976, and 26 in 1977. Four moths were caught in a localized area in the northwest corner of Waukesha county where none were trapped before. The gypsy moth parasite Compsilura concinnata (Meigen) has been found to be distributed and established over the eastern half of Wisconsin. Minnesota and Missouri set phermone traps but did not capture any gypsy moths.

Pest: SADDLED PROMINENT (Heterocampa guttivitta (Walker))

Location: Emmet, Cheboygan, Otsego, Alger, Schoolcraft, Delta, Luce, Macinac, and Chippewa counties, Michigan.

Host: Beech, Birch, Sugar maple, and Red maple.

Extent of Damage: Populations of this insect increased in the upper peninsula from last year's levels. A listing of reported defoliation of northern hardwoods is:

County	Acreage	Degree of Defoliation
Alger, Schoolcraft	50,000	Light
Luce	5,000	Moderate
Mackinac, Chippewa	30,000	Moderate to Heavy
Total	85,000	

The hardest hit area is on Drummond Island, where about 1,800 acres were defoliated twice last year (once by forest tent caterpillar) and again this year. Mortality of maple and beech is near 10% with many of the remaining trees showing top dieback. The beech seems to have suffered the most from the defoliations.

On the upper peninsula the numbers of this pest continued at about the same levels as last year. Light to moderate defoliation was reported over widely scattered areas in Emmet, Cheboygan and Otsego counties. The high population on South Manitou Island collapsed this year. Defoliation was also reported on the garden peninsula in Delta county.

Remarks: On the positive side, the defoliation has resulted in some beneficial thinning by removing some of the ironwood.

Pest: FALL WEBWORM (Hyphantria sunea, (Drury))

Location: Southern Missouri

Host: Persimmon, Walnut, and Hickory

Extent of Damage: Populations were heavy wherever their host species occurred.

Pest: OAK LEAFROLLER (Archips semiferanus (Walker))

Location: Lower Michigan

Extent of Damage: Heavy defoliation of oak was reported in Montmorency county with light to moderate defoliation observed in scattered areas throughout the northeastern lower peninsula.

Pest: SPRING AND FALL CANKERWORMS, Paleacrita vernata (Peck) and Alsophila pemetaria (Harris)

Location: Cass county, Michigan

Host: Mixed hardwoods

Extent of Damage: Severe, defoliation was reported on 300 acres.

Pest: LARGE ASPEN TORTRIX (Choristoneura conflictana (Walker))

Location: Cook county, Minnesota

Host: Aspen

Extent of Damage: Most aspen defoliation in this area was attributed to this and other unidentified tortricid species.

Pest: LINDEN LOOPER, (Erannis tiliara (Harris) and Physostegania pustularia (Guenee))

Location: Alger county, Upper Peninsula, Michigan

Host: Maple

Extent of Damage: 5,000 acres were defoliated.

Remarks: Populations were down from last year.

Pest: CHERRY LACE BUG (Corythucha sp.)

Location: Osceola county, Lower Peninsula, Michigan

Host: Black cherry

Extent of Damage: Heavy defoliation was reported on 400 acres.

Pest: ELM LEAF MINERS (Fenusa ulmi (Sundevall))

Location: Northeastern Minnesota

Host: English, Scotch and Camperdown elms, American Elm ocassionally.

Remarks: Controls were recommended to homeowners.

Pest: BIRCH LEAF MINERS (Fenusa pusilla, (Lepeletier))

Location: Alger, Schoolcraft, Dickinson, and Marquette counties of the Upper Peninsula in Michigan; northeastern Minnesota; and northern Wisconsin.

Host: Birches

Extent of Damage: Moderate to heavy defoliation.

Remarks: This insect continues to be a perennial problem.

Pest: ASPEN BLOTCH MINER (Lithocolletis tremuloidella (Braun))

Location: Carlton, Aitkin, Itasca, St. Louis, Lake, and Cook counties of Northern Minnesota

Host: Young Aspen

Extent of Damage: Moderate to heavy defoliation was widespread in northern Minnesota.

Remarks: Defoliation by this insect was often mixed with forest tent caterpillar defoliation and may have been reported as such.

Pest: VARIABLE OAKLEAF CATERPILLAR (Heterocampa manteo (Doubleday))

Location: Missouri

Host: All species of oak - White oak is preferred

Extent of Damage: Not reported in 1977.

Remarks: Missouri received one report in 1976 of moderate defoliation. This population collapsed by 1977.

Pest: WALNUT CATERPILLAR (Datana integerrima Grote & Robinson)

Location: Southwest Missouri

Host: Black walnut

Extent of Damage: Populations were light in 1977 with 30% defoliation on about 1,000 acres reported.

Pest: GREEN FRUITWORM (Lithophane antennata (Walker))

Location: Eastern one-third of Iowa

Host: Silver maple

Extent of Damage: Heavy defoliation in spring.

SUCKING INSECTS

Pest: LECANIUM SCALES (Lecanium sp.)

Location: Plainwell, Michigan and Mackinac Island, Michigan

Host: Sugar maple

Remarks: In both communities, a broadcast spraying of insecticide was being used to control mosquitoes, and flies. It appears that the use of this particular insecticide for mosquito control may have reduced the populations of predators and parasites and thus contributed to the scale outbreaks.

Pest: SARATOGA SPITTLEBUG (Aphrophora saratogensis (Fitch))

Location: Baldwin Ranger District, Manistee National Forest, Michigan

Host: Red pine, Jack pine, other conifers

Extent of Damage: Two areas composing approximately 50 acres were moderately to heavily infested.

BUD, SHOOT, STEM, AND ROOT INSECTS

Pest: PALES WEEVIL (Hylobius pales (Herbst))

Location: Christmas tree plantations in the eastern part of the Lower Peninsula, Michigan

Host: Scotch and White pine, Douglas fir

Extent of Damage: Adult feeding caused some seedling mortality, but the greatest impact resulted from severe branch "flagging". Many trees were rendered unmerchantable.

Remarks: This problem is caused to a great extent by the "choose and cut" method of harvest that is used in this area. The result is that fresh-cut stumps are scattered throughout the plantations each year and this favors a build-up of the weevil population. Attempts at chemical control have met with varied success. The U. S. Forest Service, North Central Forest Experiment Station has initiated a research program to study the biology and behavior of this insect. Their ultimate goal is to develop a more effective control strategy.

Pest: PINE ROOT COLLAR WEEVIL (Hylobius radicis (Buchanan))

Location: Northwestern part of the Lower Peninsula, Michigan

Host: The biggest problem is on scotch pine plantations. Also, red pine growing adjacent to scotch or jack pine are often seriously damaged.

Extent of Damage: This weevil is the main problem of scotch pine in this area.

Pest: NANTUCKET PINE TIP MOTH (Rhyacionia frustrana (Comstock))

Location: Missouri

Host: Shortleaf pine plantations

Extent of Damage: Reduced in 1977 by the severe winter.

Remarks: The third generation was noticeable on short leaf pine plantations on poor sites out of the natural range. Generally the populations were low enough to not be of concern.

Pest: SMALLER EUROPEAN ELM BARK BEETLE (Scolytus multistriatus (Marshall))

Location: Wisconsin

Host: American Elm

Extent of Damage: Phermone traps, placed by Wisconsin Department of Agriculture personnel, confirmed the presence of the beetle in 9 of 11 counties in which its presence had not been verified. Bark beetles were caught in the following counties: Adams, Buffalo, Jackson, Marathon, Marquette, Portage, Trempealeau, Waupaca, and Waushasa. The beetle has now been found in 46 Wisconsin counties.

Pest: PEACH BARK BEETLE, (Phloeotribus liminaris (Harris))

Location: Cass county, lower Michigan

Host: Black cherry

Extent of Damage: Trees were heavily attacked which caused them to to be covered with oozing sap.

Remarks: Apparently the insects were feeding on the slash of a cut-over area and later spread to an area already under stress from drought and eastern tent caterpillar defoliation.

Pest: ASIATIC OAK WEEVIL (Syrtepistomus eastaneus (Roelofs))

Location: Major impact in southern Missouri, but universal in State

Host: Hardwood forests especially black, white, and red oaks.

Extent of Damage: Defoliation was common but generally less than 15% of the leaf surface.

Pest: PITCH MIDGE (Cecidomjia sp.)

Location: North central lower Peninsula, Michigan

Host: Jack pine

Extent of Damage: Noticeable damage.

Pest: BLACK TURPENTINE BEETLE (Dendroctonus terebrans (Oliv))

Location: Missouri

Host: Shortleaf pine (weakened sawlog size)

Extent of Damage: Tree mortality was negligable and scattered.

Pest: RED TURPENTINE BEETLE (Dendroctonus valens LeConte)

Location: Yellow River State Forest of Northeast Iowa

Host: Red pine

Extent of Damage: Red turpentine beetles infestation in slash from thinning of red pine has killed several trees.

DISEASES

Pest: DUTCH ELM DISEASE, caused by (Ceratocystis ulmi (Buism) C. Mor)

Location: Area wide

Host: American Elm

Extent of Damage: This disease continues to reduce elm populations in the Lake States, Iowa, and Illinois. Illinois has lost about 90% of its original elm population to this disease. Michigan has lost over 80% in the State. Most of those remaining in Michigan are located on the Upper Peninsula and are dying at a rapid rate. Iowa and Missouri have lost all but 25 to 30% of their elms. Wisconsin and Minnesota, which were affected by the disease later than the other states, have 56% and 88% of their trees unaffected, respectively.

Remarks: In forested areas it is not uncommon to lose up to 10% of the elms present in a single year. This rate can be slowed down in urban areas where sanitation and diseased tree removal programs can be carried out.

Pest: SCLERODERRIS CANKER (Gremmeniella abietina) (Larberg) Morelet, (= Scleroderris lagergergii Gremmen

Location: Area wide

Location: St. Paul Area

Host: Red pine

Extent of Damage: The Minnesota Department of Natural Resources conducted a survey of State lands in which 7% of the surveyed red pine plantations are infected with the Lake States strain of Scleroderris. A total of 82 plantations have been surveyed. Four of the plantations had 5% or less of the trees infected, and one had 95% of the trees infected with 75% mortality. Laboratory tests to confirm that these plantations are infected with the Lake States strain of the fungus are not yet completed. All of the infected stands were found in northeastern Minnesota.

In Michigan the situation remains about the same as in 1976 with the major area of infection occurring in the Danaher Plains.

Remarks: Forest Insect and Disease Management surveys of National Forest land are scheduled to begin this fall in Minnesota. By June 1978, surveys of all Federal land in Minnesota, Michigan, and Wisconsin will be completed.

Research continues in New York State on the European strain of the fungus which is causing serious mortality of red and scotch pine. The USDA Animal and Plant Health Inspection Service has placed a quarantine on the area in New York and Vermont where the disease occurs, in an effort to prevent the spread of the disease.

Pest: BUTTERNUT DECLINE tentatively described as (Sirococcus sps.)

Location: Throughout the range of Butternut.

Host: Butternut

Extent of Damage: Twenty-four States were surveyed for the presence of this disease. Cankered trees were reported in twelve of the twenty-four States. The primary causal fungus was successfully isolated from trees from Indiana, Missouri, Iowa, Michigan, Wisconsin, and Minnestoa. The disease has not been found in Central Minnesota or northern Wisconsin.

Remarks: The U. S. Forest Service, North Central Forest Experiment Station is looking for non-affected trees located among infected trees. These trees will be tested for resistance to the disease in an attempt to use resistant clones as a preventative measure for the disease.

Pest: DWARF MISTLETOE (Arceuthobium pusillum Peck)

Location: Lake States

Host: Black spruce, and occasionally white spruce and tamarack

Extent of Damage: Dwarf mistletoe is the number one disease problem on Minnesota's 1.4 million acres of commercial black spruce type. A survey by the U. S. Forest Service, FI&DM, of 857 black spruce stands on the six National Forests in Minnesota, Wisconsin, and the upper peninsula of Michigan was conducted in 1976 and 1976 to provide information on the incidence of eastern dwarf mistletoe. Results showed 15% of the stands were infected. Fourteen of the infected stands had over 50% of the stems infected, 17 had from 26% to 50% of the stems infected and 69 had 1 to 25% of the stems infected.

Remarks: Last winter the Minnesota DNR did post-sale mistletoe control work on 800 acres of State Forest land. This treatment consisted of destroying residual infected black spruce in clear cut areas. The land manager is encouraged to follow logging practices that minimize the number of residual spruce left after a harvesting operation.

Pest: EUTYPELLA CANKER (Eutypella parasitica)

Location: Range of Sugar Maple

Host: Hard maple

Extent of Damage. A survey of sugar maple stands, in the upper peninsula of Michigan, by personnel of the Michigan DNR and NA, S&PF showed that the incidence of the disease was low in most stands (less than 5%) with the exception of an area in the western upper penninsula where up to 20% of the trees were infected by the canker. There was also some concern about the extent of infection by this disease in shelterwood cuts made on the Argonne Experimental Forest in Wisconsin.

Remarks: Infection generally results in timber degradation. NA, S&PF may conduct a survey for this disease on the Argonne Experimental Forest to investigate the possibility that the shelterwood-cut regeneration technique may be conducive to higher rates of infection by this disease.

Pest: WESTERN GALL RUST (Peridermium harknenii)

Location: Otsego, Emmet, Kalkaska, and Missaukee counties of the lower Peninsula, Michigan

Host: Scotch and Jack pines

Extent of Damage: Scattered pockets of mortality and branch flagging.

Remarks: Western gall rust can spread from pine to pine and cause heavy tree mortality. This disease has the potential of becoming an important problem in christmas tree plantations. A chemical control (using maneb) has been developed, but is not yet registered.

Pest: ARTISTS CONK (Fomes applanatas)

Location: Clinton county, Michigan

Host: Hard maple

Extent of Damage: Excessive mortality in two wood lots.

Remarks: This decay fungus usually causes a root and butt rot in many hardwood species, but in these two woodlots the fungus was found killing living sapwood. The reason for this may be found in the stands' history of tapping for syrup production, grazing by cattle and past logging practices.

Pest: OAK WILT (Ceratocystis fagacearum (Bretz) Hunt)

Location: Wisconsin, Minnesota

Host: Oaks

Extent of Damage: This disease is still causing significant mortality of oaks in certain areas of Minnesota and Wisconsin. In these areas, characterized by extensive root grafting, entire woodlots have been destroyed by this disease. The disease appears to be endemic in Michigan, Missouri, Iowa, Indiana, Illinois, and West Virginia so land managers feel they can tolerate the losses. The incidence for this disease remains about the same as 1976 in Minnesota and Wisconsin. The infection that was discovered in Roscommon county, Michigan in 1976 has continued to spread. This infection center is in a residential area which makes treatment more difficult. Missouri reports about 25 infection centers scattered over 20 counties.

Remarks: Recent research on the use of trenching equipment indicates that the use of such methods, for reducing the spread of this disease through root grafts, may well be warranted in high hazard zones of light soils and extensive root grafting.

Pest: VENTURIA SHOOT BLIGHT (Venturia populina (Vuill) Fabric.)

Location: Common throughout the Lake States

Host: Aspen

Extent of Damage: Causes topkill and dieback of current years shoots of aspen regeneration. No significant mortality was attributed to this disease.

Pest: OAK ANTHRACNOSE (Gnomonia quercina)

Location: Iowa, and Clare, Crawford, and Grand Traverse counties, Michigan

Host: White and red oaks, and maple.

Extent of Damage: Anthracnose was widespread in Iowa on oaks, ash, and maple.

Pest: NEEDLECAST DISEASES

Location: Area wide

Host: Red, Scotch, and Jack pines

Extent of Damage: The incidence of needlecast diseases have decreased over the past year.

Remarks: This decrease could be related to the drought and a lack of sufficient moisture levels for spore dispersal and germination.

Pest: DIPLODIA TIP BLIGHT (Diplodia pinea (Desm) Kickx)

Location: Wisconsin; Northern Minnesota; Iowa

Host: Red, Jack, Scotch, Austrian, and Ponderosa pine

Extent of Damage: This problem continues to increase in central Wisconsin and northern Minnesota. In addition to causing twig and branch mortality on up to 30% of the trees in a stand, this disease is now killing trees in both windbreaks and red pine plantations in both states. Diplodia was also quite noticeable on Austrian pine in Iowa.

Pest: OAK DIEBACK AND MORTALITY (distinct from Oak Wilt)

Location: Illinois, Minnesota, Wisconsin

Host: White, Burr, and Red oak

Remarks: Many trees failed to leaf out in the spring of 1977 and often were infested by the two-lined chestnut borer (Agrilus bilineatus (Walker)). This borer was implicated in the death of scattered oak over 10,000 acres in Wisconsin with similar mortality noted in Illinois. Much of the mortality is thought to be associated with water stress created by the drought experienced in 1976 and the spring and early summer of 1977. This type of physiological stress has also been noted on sugar maple and aspen in the same States.

Throughout central Minnesota, large acreages of red oaks wilted and lost foliage from mid-July to early August. Examination of these trees indicates that a combination of factors including water stress, two-lined chestnut borer, and Armillaria mellea root rot were the causes.

Pest: BALSAM FIR MORTALITY caused by an unidentified fungus.

Location: Central Minnesota from Brainerd to Bemidji.

Host: Balsam fir

Extent of Damage: Extensive mortality.

Remarks: The mortality was more severe on sandy soils. Randomly distributed fir would die while neighboring trees remained alive. In every case examined, multiple cankers on the main stem and branches were associated with mortality. Nectria sp. and Cytospora sp. were noted on some cankers but whether they were the primary pathogens has not been determined.

Pest: SHOESTRING ROOT ROT (Armillaria mellea (Vahl. ex Fr.))

Location: Minnesota

Host: Red and Jack pine

Extent of Damage: The mortality caused by this disease seems to have increased in young red pine plantations in Minnesota. The damage is particularly severe in cut-over hardwood stands that have been converted to red pine.

Remarks: Considering the stress that most red pine plantations were under due to the drought in 1976, it is surprising that this disease has not been more extensive in 1977.

Pest: ROOT ROTS including Fusarium oxysporum, Sclerotium batiticola, and Cylindrocladium scoparium.

Locations: Federal and State nurseries in the Lake States.

Host: Red pine

Extent of Damage: Entire planting units lost in some cases.

Remarks: The root rot problems were compounded by seedling destruction by birds and by a stunting of the seedlings shortly after germination. The cause of stunting is being investigated. Hopefully, proper fumigation with the fumigant MC-33 will alleviate the root rot problems.

Pest: VERTICILLIUM WILT (Verticillium albo-atrum)

Location: Iowa

Host: Maple

Extent of Damage: Continues to show up.

Pest: FOMES ANNOSUS

Location: State Forests in Iowa

Host: Jack, Red, White pines

Extent of Damage: Fomes annosus is continuing to show up where thinnings are being made in jack, red, and white pines, but does not generally cause significant damage.

WEATHER RELATED PROBLEMS

Problem: Drought

Location: Area wide

Trees Affected: Most tree species

Extent of Damage: The drought experienced in most areas during 1976 continued and intensified this year. Precipitation deficits (departures from normal) ranged from 3 to 15 inches (see Table 1)in many parts of Minnesota, Wisconsin, Missouri, Illinois, Iowa, and eastern Michigan. Relief finally arrived when rains came in late July. However, problems caused by, or related to, the drought are continuing to show up.

Table 1. Precipitation for 1976 and through June 1977, as compare with long-term averages.

Year	Month J	F	M	A	M	J	J	A	S	O	N	D	Total
1976	1.17	.33	1.16	.83	.41	7.52	3.31	1.21	.89	.40	.13	.62	17.98
1977	.90	.93	1.58	2.63	3.90	1.65*	-	-	-	-	-	-	-
1916-76 Average	.74	.71	1.09	1.97	3.02	3.58	3.55	3.22	2.85	2.03	1.37	.91	25.08

*Through June 17, 1977

Perhaps the greatest drought-caused impact has been on reforestation efforts in young pine plantations. Low survival rates of seeds and seedlings has required many areas to be replanted. On National Forest lands in Missouri, ninety percent of the areas planted in 1976 had to be replanted 1977. A survey of pine plantations five years or younger in Minnesota revealed up to 95% mortality caused by the drought in some plantations. Mortality ranged from 35-65% on 800 acres of recently planted red pine in northern Minnesota.

Branch dieback and mortality of pulp and timber trees have also been common on soils of low moisture-holding capacity. Mortality on 16,000 acres of 80 year old jack pine on rock outcrops and in areas of sandy soil was reported in northeastern Minnesota. An increase in jack pine mortality was also reported in northwest and west central Wisconsin. Scattered mortality has been reported on Austrian and Ponderosa pine in Missouri; white and burr oaks in Cook county, Illinois; balsam fir in eastern Michigan; sugar maple in Illinois;20,000 acres of red and black oak in south central Illinois; and 450 acres of aspen in Wisconsin. In Rusk county, Wisconsin, approximately 15,000 acres of Basswood failed to leaf out normally. However, as the summer progressed the trees recovered.

Remarks: Along with mortality, leaf scorch, and tree decline came many indirect effects of the drought. Water stressed trees became predisposed to attack by other insects and diseases. Northern pine weevil (Pissodes approximatus Hopkins) accounted for about 25 percent of red pine mortality in 2-5 year old plantations in Minnesota.

Populations are expected to be much lower in 1978 because soil moisture has returned to normal. In Wisconsin this drought stress follows two years of defoliation of oak by the fall cankerworm (Alsophila pometaria (Harris)) so additional mortality is expected. Numerous trees have succumbed to the two lined chestnut borer (Agrilus bilineatus (Weber)) in those areas under stress. Scattered bark beetle (Ips pini (Say) and other species)) flare-ups have been reported in Minnesota and Wisconsin but not to the extent anticipated. In Columbia, Gaines, and Sock counties, Wisconsin, where a severe ice storm occurred in 1976 the drought caused additional stress which killed many of the trees. Armillaria mellea has also increased in plantations less than five years old in Minnesota. Hopefully, the major impact is over, but some effects of a drought do not become evident until years later.

Problem: WIND DAMAGE

Location: Wisconsin

Trees affected: Most tree species

Extent of Damage: Approximately 850,000 acres were damaged by high winds in eastern Sawyer, Price, Lincoln, Oneida, Burnett, and Washburn counties in Wisconsin on July 4, 1977 (see Fig. 1). Of this, 192,450 acres received heavy damage. The remaining 657,550 acres received moderate to light and scattered damage. Estimated volume of timber lost on these areas were 76 million board feet of sawtimber and 1.4 million cords of pulpwood. The stumpage value of this timber was estimated to be 9 million dollars prior to the storm. The recovery value will be considerably less due to breakage and inability of the timber markets to absorb it.

Thirty thousand additional acres on the Chequamegon National Forest received damage from the same storm; 10,000 acres were considered in the severe category. The National Forest plans to salvage the 10,000 acres of heavy damage but can do very little with the remaining 20,000 acres of light damage due to markets and access problems.

Remarks: These blowdowns present high hazard areas for insects and diseases. Borers and bark beetles (Cerambycidae and Scolytidae) will become established in the dead and weakened trees and may later move to the unaffected timber. Armillaria mellea, a root rot organism, may become a problem. Any replanting to pine within two or three years may be damaged by the pales weevil (Hylobius pales (Herbst)).

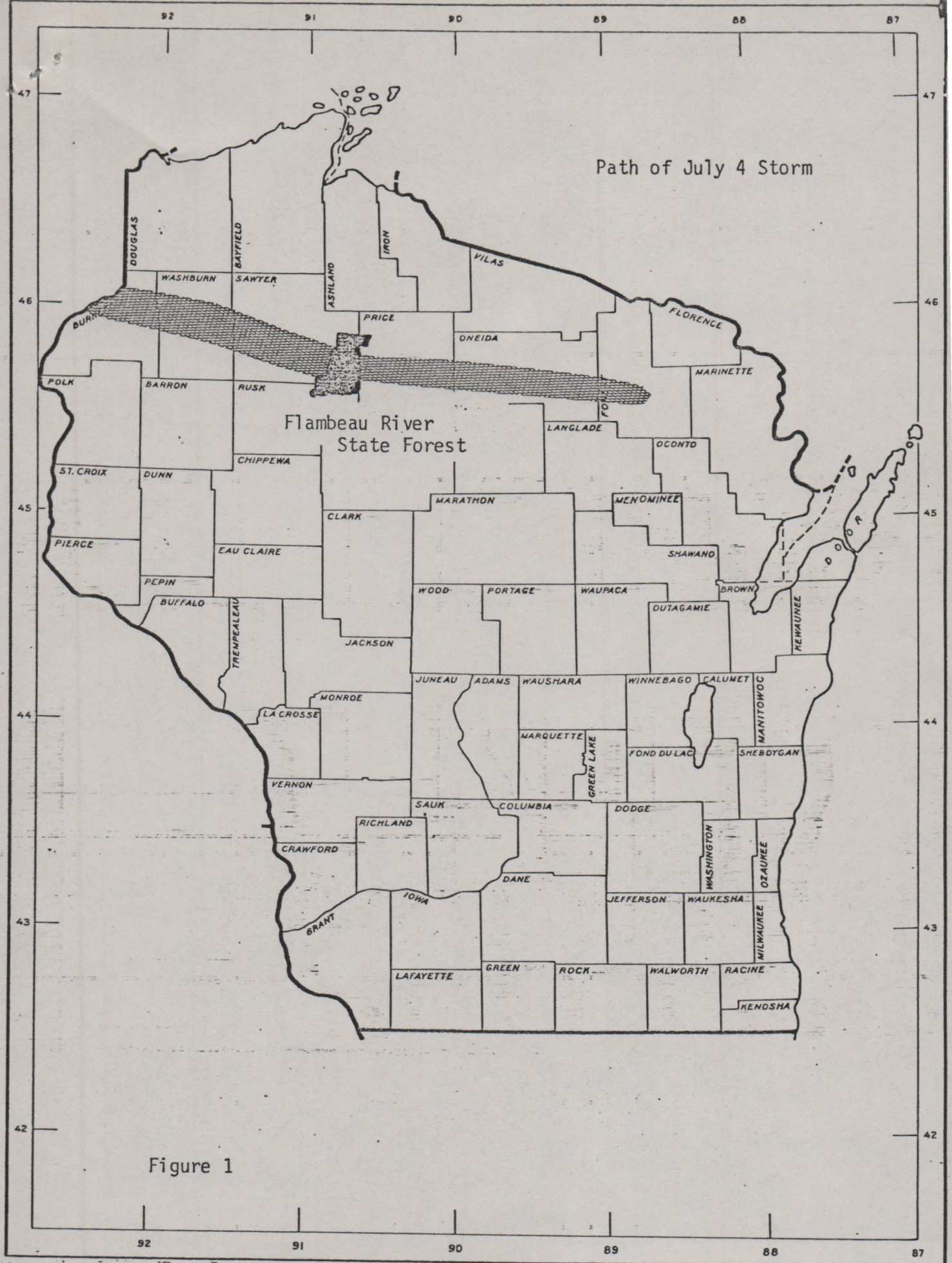
Path of July 4 Storm
Flambeau River
State Forest
DOUGLAS
BAYFIELD
WASHBURN
SAWYER
ASHLAND
IRON
VILAS
FLORENCE
PRICE
ONEIDA
MARINETTE
POLK
BARRON
RUSK
FOREST
LANGLADE
OCONTO
ST. CROIX
DUNN
CHIPPEWA
MARATHON
MENOMINEE
CLARK
PIERCE
EAU CLAIRE
SHAWANO
DOOR
PEPIN
WOOD
PORTAGE
WAUPACA
BROWN
BUFFALO
TREMPEALEAU
OUTAGAMIE
KEWAUNEE
JACKSON
JUNEAU
ADAMS
WAUSHARA
WINNEBAGO
CALUMET
MANITOWOC
MONROE
LA CROSSE
MARQUETTE
GREEN LAKE
FOND DU LAC
SHEBOYGAN
VERNON
SAUK
COLUMBIA
DODGE
RICHLAND
WASHINGTON
OZAUKEE
CRAWFORD
DANE
IOWA
JEFFERSON
WAUKESHA
GRANT
MILWAUKEE
LAFAYETTE
GREEN
ROCK
WALWORTH
RACINE
KENOSHA
92
91
90
89
88
87
47
46
45
44
43
42

Figure 1

Problem: WINTER BROWNING, WINTERBURN

Location: Area wide

Host: All Conifers

Extent of Damage: A severe winter caused browning of foliage on many conifer species. The damage varied from a slight tip burn to the entire tree being killed. Exotic species generally suffered more than native species. Exposed trees were especially hard hit with some varieties of scotch pine christmas trees in Michigan severely damaged. Scattered mortality of young balsam fir was common throughout the area. Although trees less than five years old were most severely affected, some mature trees also died. Leaf scorch on ash and oak in Iowa was also prominent.

Windburn was severe in the Eveleth Federal nursery, George Andrews nursery, and Badoura nursery, where there was not sufficient snow coverage to protect the foliage. The taller, older seedlings in the nurseries suffered more than younger, shorter seedlings. The damage always occurred in the upper parts of the seedlings or on the south edge of the beds.

Remarks: Damage can be caused in two ways. A rapid drop in foliage temperature at sunset (17 degrees per minute) can cause a sudden freezing of water within the foliage and results in tissue damage. Winter browning may also take place when the temperature is warm, but the ground is still frozen. The needles of the trees start transpiring because of the warm temperatures, but they cannot get water so they dry out and turn brown. This problem was responsible for many inquiries from the public.